

Sexually transmitted diseases, T cell subsets, and sexual practices in homosexual men attending an STD clinic

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SUMMARY Sixty three homosexually active men and 42 heterosexual men answered questionnaires regarding aspects of their social life and sexual practices. Assessment of past sexually transmitted disease showed the homosexual group to have had a significantly greater incidence of syphilis, gonorrhoea, perianal warts, and cytomegalovirus infections.

T cell subset counts were carried out, and results for 60 of the homosexual men and 39 of the heterosexual men showed that the homosexuals had a significantly greater mean T cell suppressor cell count ($p = 0.0019$). The mean T helper cell count was not significantly different between the two groups, but it was significantly more ($p = 0.033$) in the more promiscuous homosexuals (who had more than 20 sexual partners a year) than in the heterosexuals.

No relation was found between T cell subset counts and evidence of past cytomegalovirus infection.

The practice of passive anal intercourse, oroanal sex, and swallowing semen during oral sex did not appear to influence T cell subset counts in the homosexuals.

Introduction

The acquired immune deficiency syndrome (AIDS) was first described in 1981.¹⁻³ Since then over 7000 cases have been described in the United States of America. Many other countries have subsequently reported cases of AIDS. In Great Britain 69 cases had been reported to the Communicable Disease Surveillance Centre up to August 1984. In addition a possible prodromal illness has been described, which consists of at least two of the following features in a person epidemiologically at risk: unexplained weight loss of over 4.5 kg, unexplained diffuse lymphadenopathy or hepatosplenomegaly, or both, and fever of unknown origin. This has been called the AIDS related complex.⁴ It has been suggested that groups at risk in countries where none of these conditions have been described should be studied to compare demographic features and possible risk

factors in relation to immunological findings with those described in countries where AIDS has been reported.⁵ No cases of AIDS or AIDS related complex have so far been diagnosed in Northern Ireland.

Homosexual men account for about 70% of all patients with AIDS. Various risk factors and associations have been reported. This paper reports the T cell subsets in homosexual men and heterosexual male controls attending a sexually transmitted disease (STD) clinic in Belfast in relation to sexual practices. History of sexually transmitted disease is analysed, and social factors examined.

Patients and methods

STUDY POPULATION

We studied 63 homosexual men attending the STD clinic at the Royal Victoria Hospital, Belfast, and 42 heterosexual male controls from the same clinic. All patients signed informed consent forms, having been shown the relevant questionnaire and told of the tests to be performed.

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METHODS

Patients were asked to complete a questionnaire that was designed to disclose any of the prodromal symptoms of the AIDS related complex. In addition, they were asked to provide information about their previous use of social drugs, their age at first sexual intercourse including oral sex, the number of sexual partners in the previous year, the approximate total number of sexual partners ever, and their sexual practices. We also inquired into foreign travel and sexual contact with foreign nationals in the previous year and any history of having received a blood transfusion.

All patients had a full physical examination. Their temperature and weight were recorded. Urethral specimens were taken for Gram stained smears, urine samples were examined for the presence of urethritis, and specimens from the urethra and throat were cultured for the presence of *Neisseria gonorrhoeae* in all patients. In addition, homosexuals underwent proctoscopic examination, and specimens were taken for Gram stained smears and culture for *N gonorrhoeae*.

A blood sample was taken from each patient for syphilis serology using the Venereal Disease Research Laboratory (VDRL) test and the *T pallidum* haemagglutination assay (TPHA). We also investigated the presence of hepatitis B surface antigen (HBsAg), hepatitis B e antigen (HBeAg), and antibodies to HBsAg (anti-HBs) and HBeAg (anti-HBe) using enzyme linked immunosorbent assays (Organon Teknika BV Bostel, Holland). We measured cytomegalovirus (CMV) antibody using the microtitre complement fixation test of Bradstreet and Taylor⁶ at a starting serum dilution of 1/10. Full blood counts, differential white cell counts, and erythrocyte sedimentation rates were also measured.

Mononuclear cells were isolated from heparinised venous blood samples on Ficoll-Hypaque gradients. Esterase staining was used to identify monocytes. The lymphocytes were washed and suspended in RPMI 1640 medium containing 10% heat inactivated fetal calf serum. OKT4 and OKT8 positive lymphocytes (Ortho Diagnostic Systems, Raritan, New Jersey, USA) were identified by an indirect immunofluorescence assay using fluorescein conjugated goat anti-IgG (Ortho Diagnostic Systems) as the developing antibody. The mounted cells were examined under a fluorescence microscope. Two hundred esterase negative cells were counted.

STATISTICAL METHODS

Parametric methods (*t* test, analysis of variance) were first used to analyse measurement data. As the data are unlikely to satisfy all the criteria necessary for the valid interpretation of these results, however, the

TABLE 1 Mean age, age at first sexual encounter, and No of sexual partners of 63 homosexual and 42 heterosexual men

| | Homosexuals | Heterosexuals | <i>p</i> value |
|--|--------------|---------------|----------------|
| Mean (SEM) age | 27.1 (0.9) | 26.3 (1.0) | 0.510* |
| Mean (SEM) age at first sexual encounter | 18.1 (0.7) | 17.0 (0.4) | 0.163* |
| Mean (SEM) No of partners in previous year | 15.4 (2.9) | 5.5 (1.3) | 0.003 |
| Mean (SEM) No of partners ever | 121.3 (34.6) | 31.3 (9.9) | 0.015 |

*Based on *t* test result.

corresponding non-parametric techniques (Mann-Whitney U test, Kruskal Wallis test) were also applied. Except where indicated in the tables, probability values are based on the latter techniques.

Non-measurement data were analysed using the χ^2 test or, where numbers were too small for analysis by this method, using Fisher's exact probability test. The conventional level of significance ($p < 0.05$) was used for all analyses.

Results

None of the 105 patients fulfilled the criteria for the AIDS related complex either on questioning or on examination. Table I shows that the 42 control heterosexuals and the 63 homosexuals were similar for mean age and mean age at first ever sexual intercourse, but the homosexuals had had significantly more sexual partners in the previous year ($p = 0.003$) and in their lifetimes ($p = 0.015$).

Table II shows the incidence of the sexual practices of masturbation only, orogenital sex, swallowing semen during orogenital encounters, oroanal sex, and active or passive anal intercourse in the sexual encounters of the homosexual men.

Patients were questioned about their use of social drugs. Amyl nitrite had not been used by any of the control group but had been experimented with by 24 homosexuals, only three of whom described themselves as more than occasional users (less than once a month). Marijuana had been used by three of the control group and seven homosexuals, one of whom was a regular user. Four homosexuals had tried other drugs, but only one was an intravenous heroin addict. The number of regular drug users was not great enough for statistical analysis of T lymphocyte counts to be worthwhile.

Table III compares travel abroad and sexual intercourse with foreigners by homosexual and heterosexual men during the previous year. The differences in travelling habits were not significant, but homosexuals had significantly more sexual contacts

TABLE II Sexual practices on encounters of 63 homosexual men

| Sexual practices | No (%) who had experienced sexual practices listed: | | | | |
|--|---|-----------|--------------|-----------|---------|
| | Never | Rarely | Occasionally | Usually | Always |
| Masturbation only encounter | 2 (3.2) | 11 (17.5) | 23 (36.5) | 24 (38.1) | 3 (4.8) |
| Orogenital encounter | 4 (6.3) | 14 (22.2) | 19 (30.2) | 24 (38.1) | 2 (3.2) |
| Swallowing semen during orogenital encounter | 27 (42.9) | 18 (28.6) | 9 (14.3) | 6 (9.5) | 3 (4.8) |
| Oroanal sexual encounter | 36 (57.1) | 16 (25.4) | 9 (14.3) | 2 (3.2) | 0 |
| Active anal intercourse | 10 (15.9) | 22 (34.9) | 27 (42.9) | 4 (6.3) | 0 |
| Passive anal intercourse | 10 (15.9) | 26 (41.3) | 13 (20.6) | 12 (19) | 2 (3.2) |

than heterosexuals with Europeans ($p=0.016$) and with north Americans ($p=0.051$).

Table IV compares the history of STD and serological evidence of past infection with hepatitis B, CMV, and syphilis in homosexuals and heterosexuals. Non-specific urethritis was a very common disorder in both groups, but homosexuals had a greater history of syphilis, gonorrhoea, perianal warts, and infections with CMV and hepatitis B. The differences between the two groups were significant for all these STDs except hepatitis B virus (borderline significance, $p=0.059$).

Table V shows mean OKT4 and OKT8 counts and percentages in homosexuals and heterosexuals. Three of the blood specimens from each group had clotted before examination and could not be repeated. The 60 specimens from homosexuals had a higher mean OKT4 count than the 39 specimens from heterosexuals, but the difference was not significant ($p=0.060$). The mean OKT8 count was seen to be significantly greater in the homosexuals than the heterosexuals ($p=0.0019$). These results produced a significantly lower ratio of OKT4/OKT8 in the homosexuals than the heterosexuals ($p=0.029$).

One homosexual patient had an OKT4/OKT8 ratio of less than 1.0, but he was known to be infected with hepatitis B virus and had HBeAg. Liver biopsy had shown that he had chronic active hepatitis with cirrhosis, in which these are recognised findings.⁷

TABLE III Travel and sexual intercourse with foreigners by 63 homosexuals and 42 heterosexuals in the previous year

| | No (%) of homosexuals | No (%) of heterosexuals | p value |
|--------------------------|-----------------------|-------------------------|---------|
| Travel in: | | | |
| Europe | 30 (47.6) | 22 (52.4) | 0.780 |
| North America | 6 (9.5) | 2 (4.8) | 0.614* |
| Other countries | 5 (7.9) | 2 (4.8) | 0.831* |
| Sexual intercourse with: | | | |
| Europeans | 31 (49.2) | 10 (23.8) | 0.016 |
| North Americans | 15 (23.8) | 3 (7.1) | 0.051 |
| Other nationalities | 10 (15.9) | 4 (9.5) | 0.519 |

* Fisher's exact probability test used as numbers were too small for the χ^2 test.

TABLE IV History of sexually transmitted disease in 63 homosexual and 42 heterosexual men

| | No (%) of homosexuals | No (%) of heterosexuals | p value |
|--------------------------|-----------------------|-------------------------|---------|
| Syphilis | 7 (11.1) | 0 | 0.0486* |
| Gonorrhoea | 24 (38.1) | 7 (16.7) | 0.032 |
| Non-specific urethritis | 51 (81.0) | 35 (83.3) | 0.959 |
| Penile warts | 6 (9.5) | 9 (21.4) | 0.155 |
| Anal warts | 20 (31.7) | 0 | <0.001 |
| Hepatitis B virus | 10 (15.9)† | 1 (2.4)‡ | 0.059 |
| Cytomegalovirus antibody | 40 (63.5) | 6 (14.3) | <0.001 |

* Fisher's exact probability test.

† One patient was a carrier of hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg). The other nine had antibodies to HBsAg and four of them had antibodies to HBeAg.

‡ Patient had antibodies to HBsAg.

The homosexual group was divided into those who had 20 or more sexual partners a year and those having less than 20 partners a year. Table VI shows that the trends shown in table V were accentuated in homosexuals who had 20 or more partners a year, so that the difference in OKT8 counts between this group and the heterosexual control group was even more significant ($p=0.002$). Similarly, the difference in OKT4 counts, which was not significant ($p=0.06$) between all the homosexuals and heterosexuals, reached a significance of $p=0.033$ when homosexuals with 20 or more partners a year were compared with heterosexuals.

The mean (SEM) total lymphocyte count in the homosexuals was $1.814 (0.094) \times 10^9/l$, which was significantly higher than that of $1.526 (0.087) \times 10^9/l$ in the heterosexuals ($p=0.0325$ using the Mann-Whitney U test). No patient was found to have appreciably depleted lymphocytes.

TABLE V Mean (SEM) OKT4 and OKT8 counts and percentages in 60 homosexual and 39 heterosexual men

| | Homosexuals | Heterosexuals | p value |
|-----------------------------|--------------|---------------|---------|
| OKT8 counts $\times 10^9/l$ | 0.4 (0.035) | 0.3 (0.021) | 0.0019 |
| OKT8 percentage | 23.6 (0.731) | 20.9 (0.656) | 0.0173 |
| OKT4 counts $\times 10^9/l$ | 0.7 (0.041) | 0.6 (0.036) | 0.0601 |
| OKT4 percentage | 37.4 (0.918) | 38.5 (1.376) | 0.5469 |
| Ratio of OKT4/8 counts | 1.6 (0.049) | 1.9 (0.071) | 0.0098 |

TABLE VI Mean (SEM) OKT4 and OKT8 counts and percentages in 39 heterosexual men and 60 homosexuals divided into those who had had 20 or more ($n = 14$) or less than 20 ($n = 46$) sexual partners in the previous year

| | Homosexuals who had had: | | Heterosexuals | p value |
|-----------------------------|--------------------------|--------------|---------------|---------|
| | ≥20 partners | <20 partners | | |
| OKT8 counts $\times 10^9/l$ | 0.5 (0.05) | 0.4 (0.04) | 0.3 (0.02) | 0.002 |
| OKT8 percentage | 23.1 (0.96) | 23.7 (0.91) | 20.9 (0.66) | 0.059 |
| OKT4 counts $\times 10^9/l$ | 0.8 (0.09) | 0.6 (0.05) | 0.6 (0.30) | 0.033 |
| OKT4 percentage | 38.1 (1.29) | 37.2 (1.14) | 38.5 (1.37) | 0.736 |
| Ratio of OKT4/8 counts | 1.7 (0.11) | 1.6 (0.05) | 1.9 (0.07) | 0.029 |

The OKT4 and OKT8 lymphocyte counts were compared for homosexuals who had and who had not experienced any sexual practices of oroanal sex, swallowing semen, or passive anal intercourse. The same comparison was made for those who had evidence of past CMV infection and those who had not. No significant difference was found for any of these categories.

Discussion

No cases of AIDS had been reported in Northern Ireland at the time of writing this paper. Our homosexual patients therefore fulfilled the suggested criteria of being a group at risk in a community from which no cases had been notified.⁵

The first points to establish were how the sexual behaviour patterns and the history of disease compared with those in other studies. The number of changes of partners in a year and the total number of partners of the homosexuals in this study were smaller than those quoted in studies from the United States.^{8,9}

The finding of evidence of past CMV infection in 63.5% of the homosexuals was in keeping with other studies, which showed a higher incidence of past infection in homosexual patients than in heterosexuals.^{10,11} Similarly, the increased incidence of syphilis, gonorrhoea,¹² anal warts, and infection with hepatitis B¹³ all indicated that homosexual patients were subject to more frequent infection than their heterosexual counterparts in the community, as has been found elsewhere.

The question on sexual activity with foreign partners showed that our homosexual patients had by no means been isolated from contact with communities where AIDS has been reported. Although it was not part of our questionnaire, we know that many of our homosexual patients had regular sexual contacts in London where most British cases of AIDS have been reported.

Previous studies have shown abnormalities of helper and suppressor cell numbers in homosexual men as opposed to heterosexuals. That of Kornfeld *et al* showed asymptomatic homosexuals to have a

fall in OKT4 count but a rise in OKT8, resulting in a significantly lower OKT4/OKT8 ratio in the homosexual group.⁸ The patterns seen in our study, which showed a significant increase in OKT8 numbers among the homosexuals and in OKT4 numbers, especially in the more promiscuous homosexuals, equates closely with that found by Fahey *et al*, who concluded that immune augmentation of OKT8 numbers may be a common finding in healthy homosexual men.¹⁴ The total lymphocyte counts of all the patients were within normal limits.

Detels *et al* reported increased helper and suppressor cells in homosexuals practising any passive intercourse as opposed to those not practising passive anal intercourse.⁹ We did not find any relation between OKT4 or OKT8 counts and the practices of active or passive anal intercourse or the practices of oroanal sex or swallowing semen during orogenital sexual activity.

From the data provided by this study we can conclude that the homosexual patients attending our clinic were comparable with those in other centres in that they tended to be more promiscuous than heterosexual patients and were more likely to acquire a number of sexually transmitted diseases, such as syphilis, gonorrhoea, CMV, anal warts, and hepatitis B, but they did not show any evidence of AIDS either clinically or in recognised changes in OKT4 numbers.

The homosexuals in this study have not been isolated from communities where AIDS has been reported and must therefore, on known epidemiology of the condition, be at risk.¹⁵ They are thus an interesting group to follow prospectively for the advent of any changes in their immune state.

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